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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re:		:	
Applicant:	Ronald D. Green	:	Attorney Docket: 1273-004
Serial No.:	08/920,600	:	Examiner: John J. Gallagher
Filing Date:	August 28, 1997	:	Group Art Unit: 1733

Title: AEROSOL SOLVENT WELD CEMENT, DISPENSING SYSTEM AND METHOD OF JOINING PLASTIC PIPE

Assistant Commissioner for Patents
Washington, D.C. 20231

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.10
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I hereby certify that this correspondence is being deposited with the U.S. Postal Service as U.S. Express Mail in an envelope addressed to Commissioner for Patents and Trademarks, Washington, D.C. 20231.

Lisa M. Brooks

DECLARATION OF RONALD D. GREEN UNDER 37 C.F.R. § 1.132 IN SUPPORT OF PATENTABILITY

I, Ronald D. Green, being duly cautioned, declares as follows:

1. I have had over thirty (30) years of experience in the construction trades, including at least fifteen (15) years in the field of residential, commercial and municipal plumbing fields, and am familiar with the state of the art for joining plastic pipe using liquid solvent weld cements.

2. As the inventor of the subject matter of the subject application, including the presently pending claims, and have reviewed the Official Action issued in the subject application. I

have also reviewed and am familiar with the cited references mentioned in the Official Action, including the King, Sr. patent (U.S. Patent 4,687,798), the Smrt et al. patent (U.S. Patent 5,453,219), the Meyers patent (U.S. Patent 5,336,351), and the Masuzaki et al. patent (U.S. Patent 5,480,925).

Long Felt Need

3. For decades there has been a long-felt need for improvements in methods of joining plastic pipe, such as those using a liquid solvent weld cement represented by the King, Sr. patent, the Smrt et al. patent, and the Meyers patent. The solvent weld cements to date have been exclusively liquid and, although improvements have been made, continue to have several problems: (1) spillage of the liquid solvent weld cements during transport and use; (2) the declining shelf life of liquid solvent weld cements once exposed to air (cans of liquid solvent weld cement will cure if not readily and completely capped); (3) the relatively short "leave time" (i.e., the time between the application of the liquid solvent weld cement to the pipe to be joined and the time when the pipe must be attached before the liquid solvent weld cement begins to cure); (4) the relatively long "set-up time" (i.e., the time between the joining of the pipe portions and the time when the liquid solvent weld cement has sufficiently cured to permanently attach the pipe portions so that they may be subjected to stress without danger of loosening the joint formed); and (5) in most applications, the need to use a primer to clean and prepare the surface of the plastic pipe for application of the solvent weld cement, thus requiring two containers which increases transport and storage costs, and two steps which reduces efficiency. Other problems associated with liquid solvent weld cements included (1) the need to use two hands to hold the liquid cement canister and the solvent weld applicator (typically a brush); (2) the waste and mess

associated with application of a liquid solvent weld cements; (3) the gelling of the liquid solvent weld cements upon exposure to low temperatures and/or air; and (4) a shelf life of the liquid solvent weld cements typically on the order of only about 18 months.

Failure of Others

4. Although there have been improvements to liquid solvent weld cements, the problems associated with the use of liquid solvent weld cements to join plastic pipe, referred to in paragraph 3, have remained essentially unsolved. As evidence of such problems, and the steps needed to prevent or correct some of them, attached as Exhibit A is a copy of directions for use of an existing liquid solvent weld cement product. Page 1 of these directions includes instructions for handling in hot weather and cold weather. The aerosol solvent weld cements used in the methods of the present invention offer the advantage of cooling the surface in hot weather applications whereas the directions call for a separate cooling step (i.e., step A.). The aerosol solvent weld cements used in the methods of the present invention offer the advantage of setting up faster than liquid solvent weld cements, which set slowly as reflected on Page 1 of these directions. Page 1 of these directions includes instructions for handling to prevent curing of the liquid solvent weld cement in the can (see the section of Exhibit A on Page 1 entitled "After Cementing:" and the section of Exhibit A on Page 1 entitled "Handling of Oatey Cement;" continued on the top of Page 1); requirements for use of and storage of both the primer and the solvent weld cement; the requirement to assemble the pipe joint quickly owing to the short "leave time" (see admonishment on Page 1 to work quickly when applying and assembling); admonishment to refrain from handling joints immediately after assembly owing to

the relatively long "set up time" " (see admonishment on Page 1 to refrain from handling freshly assembled joints).

Also, one of the most well established companies selling liquid solvent weld cements, and typical of those in the industry, fails to offer anything but a wide variety of liquid solvent weld cements for joining plastic pipe. See Exhibit A, Page 2.

Unexpected Results

5. In an effort to determine the differences in the joints in plastic pipe using representative methods utilizing a liquid solvent weld cement and similar representative methods utilizing an aerosol solvent weld cement in accordance with the present invention, experiments were conducted by Camie-Campbell, Inc. of St. Louis, Missouri, and under the supervision of the undersigned, to compare the strengths of plastic pipe joints achieved by both methods, as set forth below.

6. An experiment was conducted by Camie-Campbell, Inc., according to ASTM D-2564 (a copy a portion of which is attached as Exhibit B) using several solvent weld cement mixtures prepared identically with the exception that one was prepared as a liquid and the other was prepared in aerosol form. The mixtures were each applied to a smooth plastic coins, the liquid solvent weld cement being applied using a brush as is typically done, and the aerosol solvent weld cement was applied by spraying. Measurements were taken of lap shear strengths, as defined by paragraph 5.4 of Exhibit B, on 4 joints made in accordance with methods and aerosol formalations generally falling within claim the scope of claim 27 as presently styled. The results were as follows:

Solvent Weld Formulation

Lap Shear Strength for Both Liquid and Aerosol	Oatey SWC L-7025	Camie-Campbell SWC L-7221	Camie-Campbell SWC L-7221	Camie-Campbell SWC L-7221
Liquid (2hrs.)	330 avg. PSI 384 max. PSI	230 avg. PSI 324 max. PSI	296 avg. PSI 318 max. PSI	267 avg. PSI 302 max. PSI
Aerosol (2hrs.)	330 avg. PSI 363 max. PSI	325 avg. PSI 471 max. PSI	337 avg. PSI 503 max. PSI	276 avg. PSI 447 max. PSI
Percent change in Aerosol	+0% avg. PSI -5.5% max. PSI	+41.3% avg. PSI +45.4% max. PSI	+13.8% avg. PSI +58.2% max. PSI	+3.4% avg. PSI +48.0% max. PSI

The foregoing experiment demonstrated convincingly that methods using solvent weld cements dispensed in aerosol form to join plastic pipe of the present invention unexpectedly gave a joint of superior lap shear strength, and that one of ordinary skill would recognize that similar results would be obtained among methods within the scope of the invention as presently claimed.

7. I personally supervised an experiment, according to ASTM D-2564 (a copy a portion of which is attached as Exhibit B) using several solvent weld cement mixtures prepared in aerosol form. The aerosol solvent weld cement mixtures were each applied to join a bell spigot onto a length of plastic pipe by spraying. Measurements were taken of hydrostatic burst strengths as defined by paragraph 5.5 of Exhibit B on 4 joints made in accordance with methods generally falling within claim the scope of claim 27 as presently styled. The results were as follows:

Hydrostatic Burst Strength (After 2 Hour Curing Time)

Oatey SWC	Camie-Campbell SWC	Camie-Campbell SWC	Camie-Campbell SWC

Hydrostatic Burst Strength (After 2 Hour Curing Time)

	Oatey SWC L-7025 (Aerosol)	Camie-Campbell SWC L-7221 (Aerosol)	Camie-Campbell SWC L-7222 (Aerosol)	Camie-Campbell SWC L-7223 (Aerosol)
Trial No. 1	1075 PSI	1375 PSI	1300 PSI	1375 PSI
Trial No. 2	1025 PSI	1375 PSI	1350 PSI	1425 PSI

By way of comparison, liquid solvent weld cements of the prior art, including Oatey SWC L-7025 in liquid form, typically gave hydrostatic burst testing results not substantially greater than the 400 p.s.i., the minimum average hydrostatic burst strength required by ASTM D-2564 (see Exhibit B, paragraph 5.5). Thus, the average hydrostatic burst strengths achieved using the method of the present invention as presently claimed, with a variety of aerosol solvent weld cements, were unexpectedly several times the minimum average hydrostatic burst strength required by ASTM D-2564 (i.e., 2.56 to 3.56 times the required minimum average hydrostatic burst strength of 40 p.s.i.).

The foregoing experiment demonstrated convincingly that methods using solvent weld cements dispensed in aerosol form to join plastic pipe of the present invention unexpectedly gave a joint of superior hydrostatic burst strength, and that one of ordinary skill would recognize that similar results would be obtained among methods within the scope of the invention as presently claimed.

8. It has generally been my experience in using liquid solvent weld cements in methods of the prior art, and aerosol solvent weld cements in the methods of the claimed invention, that liquid solvent weld cements have "leave times" of less than 20 seconds (i.e., the time one may wait

before assembling a pipe joint after application of a liquid solvent weld cement to the pipe surface(s), and still be able to join the pipe sections without there being sufficient curing of the liquid solvent weld cement to prevent assembly of the joint), while aerosol solvent weld cements have "leave times" on the order of about 45-60 seconds..

9. It has generally been my experience in using liquid solvent weld cements in methods of the prior art, and aerosol solvent weld cements in the methods of the claimed invention, that liquid solvent weld cements have "set up times" of greater than about 20-30 seconds, while aerosol solvent weld cements have "set up" times on the order of less than about 5 - 10 seconds (generally speaking, the amount of time it takes to rotate the freshly joined pipe about one quarter turn).

10. It has generally been my experience in using liquid solvent weld cements in methods of the prior art, and aerosol solvent weld cements in the methods of the claimed invention, that liquid solvent weld cements typically require the use of a primer to assure a workable joint is formed between the joined sections of pipe, while aerosol solvent weld cements may be applied without the prior application of a primer and still achieve a workable joint formed between the joined sections of pipe.

Ready Acceptance by the Trade

11. On February 20, 1998, I received from Mr. Dick Schermerhorn of Cortec, Inc. of Appleton, Wisconsin, the facsimile letter attached as Exhibit C. Mr. Schermerhorn reported to me the comments from mechanical contractors and "P,V&F" distributors to whom he had supplied "Quikweld" an aerosol solvent weld formulation referred to above as Camie SWC L-7223, to test its use as a solvent weld cement to join plastic pipe in accordance with methods of the present

invention. Mr. Schermerhorn characterized the response to the "Quikweld" product in use as "outstanding," and passed along the following characterizations and comments: "fantastic," "we want an exclusive [on the product]," 'how soon can we get some [of the product]," and "super."

12. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or any patent issuing thereon.

13. Further declarant saieth naught.

9/17/98
Date

Ronald D. Green
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